



Armed Forces College of Medicine AFCM



Short ascending pathways

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INTENDED LEARNING OBJECTIVES (ILO)



By the end of this lecture, the student will be able to:

- 1. List the short ascending tracts and their functions.**
- 2. Predict the effects of lesion of these tracts.**

Lecture Plan



- 1. Part 1 (10 min) Introduction & general plan**
- 2. Part 2 (30 min) Spino- cerebellar tracts**
- 3. Part 3 (15 min) Other short ascending tracts**
- 4. Summary (5 min)**

Sensory pathways

4 Long ascending tracts (reaching the cerebral cortex)

- **Ant. spino-thalamic tract** (for crude touch & pressure)
- **Lat. spino-thalamic tract** (for pain & temperature)
- **Gracile tract** (for light touch & proprioception from lower ½ of trunk & LL)
- **Cuneate tract** (for light touch & proprioception from upper ½ of trunk & UL)

4 Short ascending tracts (not reaching the cerebral cortex)

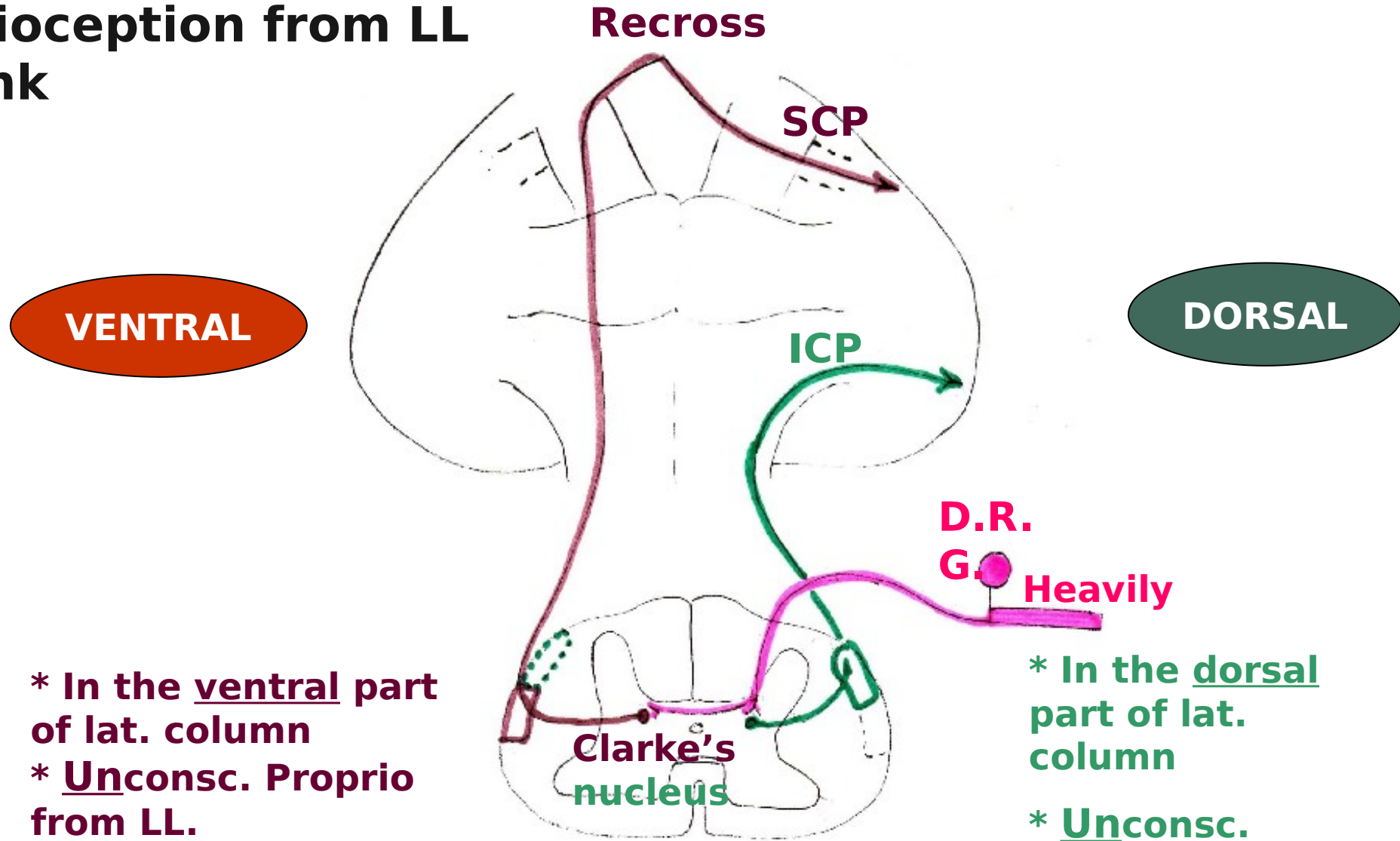
- **Spino-cerebellar tract**
- **Spino-tectal tract**
- **Spino-reticular tract**
- **Spino-olivary tract**

II. 4 Short ascending tracts (not reaching the cerebral cortex)

- **Spino-cerebellar tracts**
- **Spino-tectal tract**
- **Spino-reticular tract**
- **Spino-olivary tract**

Spino-cerebellar Ts.

* Unconscious proprioception from LL \pm trunk



	Dorsal spino-cerebellar tract	Ventral spino-cerebellar tract
2 nd order neuron	<u>Ipsilat.</u> Clarke's nucleus (C8 - L3).	<u>Both</u> Clarke's nuclei, mainly the <u>contralat.</u> One (Crossing in the ant. White commissure), or Laminae V,VI,VII in lumbar, sacral and coccygeal spinal segments.
Termination	Cerebellum via <u>inf.</u> cerebellar peduncle (I.C.P.).	Cerebellum via <u>sup.</u> cerebellar peduncle (S.C.P.), <u>after recrossing</u> at the level of the midbrain.
Position in the <u>lat.</u> column of the spinal cord	<u>Slightly dorsal</u>	<u>Slightly ventral</u>
Function: Carries <u>un</u> conscious proprioception from	LL, trunk. (It is equivalent to the <u>cuneo-cerebellar tract</u>) For coordination of posture and	LL. For coordination of posture and movement.



Relax, if you can

Spino-tectal T.

* **Spino-visual reflex**
(movement of the eyes, neck
&/or trunk towards a moving
object of interest).

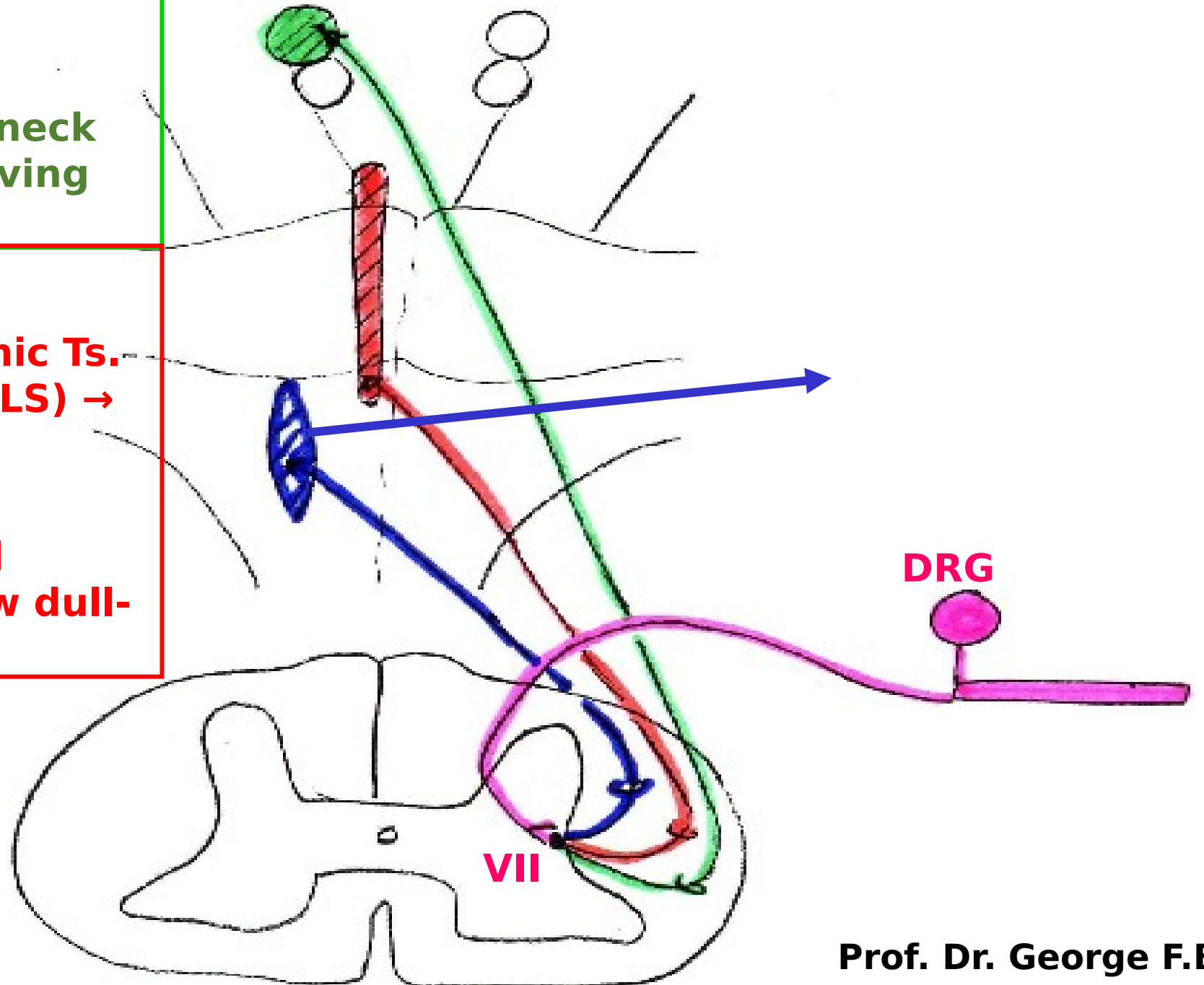
Spino-reticular T.

• **Forms with spinothalamic Ts.**
the anterolat. System (ALS) →
major input to RAS →
Awakening.

• **Projects to the cerebral
cortex as a route for slow dull-
aching pain sensation.**

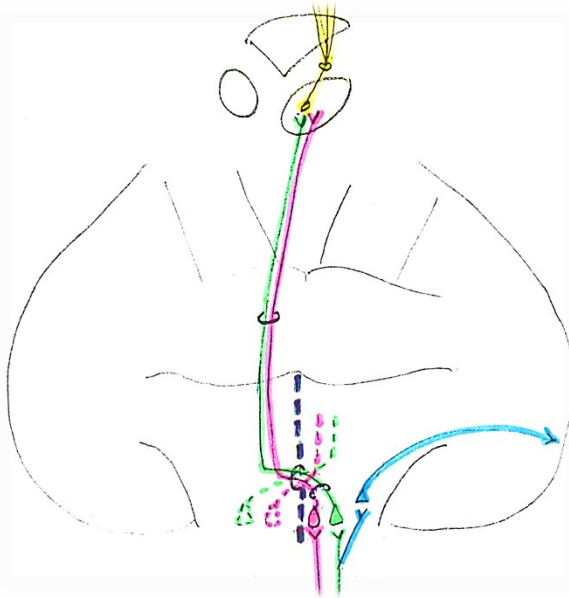
Spino-olivary T.

* **Unconscious
proprioception from
both UL & LL to the
ipsilat. cerebellum**

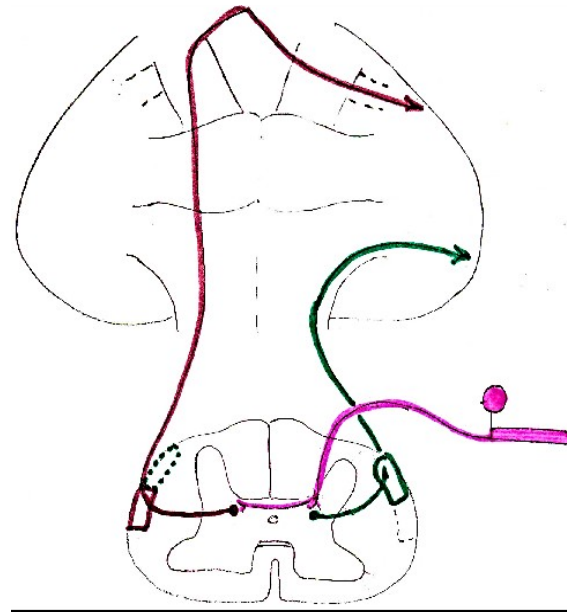


	Spino- tectal	Spino- reticular	Spino- olivary
2nd order neuron = Lamina	VII	VII	VII
Termination	Contralat. sup. colliculus (part of tectum of midbrain)	Contralat. reticular formation	Contralat. inf. olivary nucleus of medulla
Function	Afferent limb of the spino- visual reflex (movement of the eyes, neck &/or trunk towards a moving object of interest).	1- Forms with lat. & ant. spinothalamic tracts the Antero-Lateral System (ALS) which is the major input to the Reticulat Activating System (RAS) → Awakening 2- Projects to the cerebral cortex as a	Uncoscious proprioception from both UL & LL to contralat. inf. olive which projects to the contralat. cerebellum via the I.C.P.

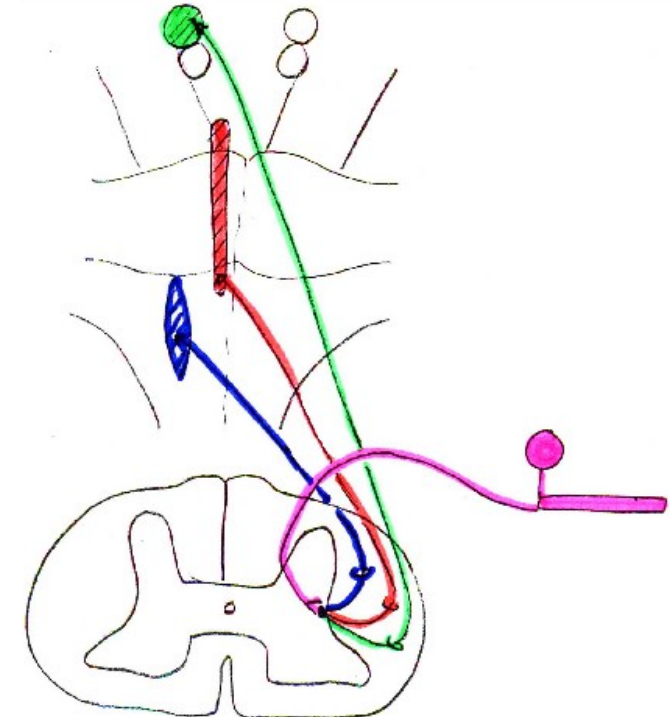
Tracts carrying proprioception



**Gracile &
Cuneate Ts.**
+
**cuneo-
cerebellar T.**



**Dorsal &
ventral
spino-
cerebellar
Ts.**



**spino-olivary
Ts.**

Important summary for those who want to understand

• Proprio from the ~~thigh~~ ~~trunk~~ is carried by:

1- ~~G~~ ~~u~~ ~~n~~ ~~e~~ ~~a~~ ~~t~~ ~~e~~ T.T.

2- ~~S~~ ~~p~~ ~~i~~ ~~n~~ ~~e~~ ~~-~~ ~~c~~ ~~e~~ ~~r~~ ~~e~~ ~~b~~ ~~e~~ ~~l~~ ~~l~~ ~~a~~ ~~r~~ ~~T~~ ~~T~~.

3- Spino-olivary T.



Conscious sense of sartorius muscle is carried by which of the following tracts?

- A. Ventral spino-cerebellar.**
- B. Dorsal spino-cerebellar.**
- C. Spino-olivary.**
- D. Gracile.**
- E. Cuneate.**



Conscious sense of sartorius muscle is carried by which of the following tracts?

A. Ventral spino-cerebellar.

B. Dorsal spino-cerebellar.

C. Spino-olivary.

D. Gracile.

E. Cuneate.

Thank
you!

